CLAIMS

1. A sound reproduction system for providing sound to two adjacent first and second users, the system comprising first and second speaker means positioned respectively adjacent to the intended head positions of the first and second users, each speaker means comprising a pair of speakers one of which faces inwards towards the head position of the first user, and the other faces outwards from said head position and generally towards the intended head position of the second user, filter means (H_1) controlling the input to the outwardly facing speaker relative to the input applied to the inwardly facing speaker, the filter means (H_1) being designed by adjusting the filter coefficients thereof so as to reduce the sound that would be perceived by the second user due to the first speaker means.

2. A sound reproduction system as claimed in claim 1 in which the filter means (H_1) has been designed by adjusting the filter coefficients thereof so as to maximise the ratio of the mean square pressures in the zone occupied in use by the head of the first user relative to the mean square pressures in the zone occupied in use by the head of the second user.

3. A sound reproduction system as claimed in claim 2 in which the filter means (H_1) has been designed by minimisation of the mean square pressures at an array of points in the zone to be occupied by the head of the second user.

4. A sound reproduction system as claimed in claim 1 in which the filter means has been designed by adjusting adaptive filters in an error minimisation filter design procedure.

5. A sound reproduction system as claimed in claim 1 in which the filter means (H_1) has been designed by adjusting the filter coefficients such that the pressure, or the mean square pressure, at one or more discrete locations in the region of the second head position, at a particular frequency, due to sound emitted by the first and second speakers, is substantially zero.

6. A sound reproduction system as claimed in claim 5 in which the filter means (H_1) provides a delayed and weighted version of the signal input to the filter means.

7. A sound reproduction system as claimed in claim 5 or claim 6 in which a pre-conditioning filter means (H_2) is provided in the inputs to said pair of speakers, the pre-conditioning filter means (H_2) being configured to adjust the frequency response of the overall system, as experienced by the first user.

8. A sound reproduction system as claimed in claim 7 in which the pre-conditioning filter means (H_2) is substantially of the form $H_2 = \left(1 - Re^{-j\omega\tau}\right)^{-1}$ where $R < 1$.

9. A sound reproduction system for providing sound to two adjacent first and second users, the system comprising first speaker means positioned adjacent to the intended head position of the first user, and second speaker means positioned adjacent to the intended head position of the second user, a first channel connected to the first speaker means to enable, in use, the first user to listen to sound conveyed by said first channel, and a second channel connected to the second speaker means to enable, in use, the second user to listen to sound conveyed by said second channel, and a feedforward compensating filter means (H_1, H_2)

having an input connected to the inputs to the first speaker means, and an output connected to the input to the second speaker means, the compensating filter means being so configured as to provide to the second speaker means a modified version of the signals being fed on said first channel to the first speaker means, said compensating filter means ($\mathbf{H}_1$, $\mathbf{H}_2$) having been determined to reduce the sound that would be perceived by the second user to have been emitted by the first speaker means.

10. A sound reproduction system as claimed in claim 9 in which the filter means ($\mathbf{H}_1$, $\mathbf{H}_2$) has been determined by calculating the vector of complex pressures $\mathbf{p} = [p_1 p_2]^T$ using an equation of the form $\mathbf{p} = \mathbf{p}_p + \mathbf{Z}\mathbf{q}_s$ where $\mathbf{p}_p$ is the pressure at the head position of the second user due to the primary sound source of said first speaker means, and $\mathbf{Z}$ is the matrix of acoustic impedances between $\mathbf{p}$ and $\mathbf{q}_s$ of the second speaker means, and $\mathbf{q}_s = \mathbf{q}_{s,opt} = -\mathbf{Z}^{-1}\mathbf{p}_p$ where the complex volume velocities of the speakers of the second speaker means are $\mathbf{q}_s = [q_{s1} q_{s2}]^T$.

11. A sound reproduction system as claimed in claim 9 in which the compensating filter means has been determined by adjusting adaptive filters in an error minimisation filter design procedure.

12. A sound reproduction system as claimed in claim 9 in which the first and second speaker means are mounted on or in first and second adjacent headrest assemblies.

13. A sound reproduction system as claimed in any one of claims 10 to 12 in which each of said speaker means comprises respective right and left speakers positioned in use adjacent to the right and left sides of the user's head.

14. A sound reproduction system as claimed in claim 13 in which the compensating filter means is adapted to receive a signal that is fed to only one of the speakers of the first speaker means, said one speaker being the speaker that is closer to the second speaker means.

15. A sound reproduction system as claimed in claim 12, or claim 13 or claim 14 each as appended to claim 12, in which the speaker means are housed in wings of the headrest, the speakers facing generally towards the respective head positions.

16. A sound reproduction system as claimed in any one of claims 10 to 15 in which the compensating filter means (H_1, H_2) comprises a series of filter coefficients calculated for a range of frequencies extending up to about 400Hz.

17. A sound reproduction system as claimed in any one of claims 10 to 15 in which the compensating filter means (H_1, H_2) comprises a series of filter coefficients calculated for a range of frequencies extending up to about 600Hz.